UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,015	02/03/2006	Katsuyuki Arimoto	2006_0089A	9414

52349 7590 12/10/2008

WENDEROTH, LIND & PONACK L.L.P.
2033 K. STREET, NW
SUITE 800
WASHINGTON, DC 20006

EXAMINER	
CERULLO, LILIANA P	
ART UNIT	PAPER NUMBER
2629	
MAIL DATE	DELIVERY MODE
12/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,015	ARIMOTO ET AL.	
	Examiner	Art Unit	
	LILIANA CERULLO	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/3/06, 7/3/07, 6/17/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Matrix display with gamma-correction based on gamma characteristics pairs and different input transmittance level.

Claim Objections

2. **Claims 14-26** are objected to because of the following informalities: Claims 14 to 26 use the symbol γ but fail to explain the meaning intended by the symbol; because it is clear from the disclosure that the meaning intended is that of gamma correction or gamma characteristics, the examiner interpreted it as such for the purpose of examination. **Claim 23** also recite the symbols R, G and B, but fail to explain the meaning intended by the symbol. Thus, the examiner interpreted R, G and B to mean red, green and blue.

Furthermore, **claim 16** line 3 recite the limitation "…if k is an integer…" The use of the word "if" renders the claim indefinite. Thus, the examiner interpreted the limitation to read "... where k is an integer..."

Also, **claim 20** last line recite the limitation "a block unit of the two pixels per block", there is insufficient antecedent basis for the word "the" in the claim. Thus, the examiner interpreted the limitation to read "a block unit of two pixels per block".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 14-26** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are the definition of a distribution area ratio. Claims 14 to 26 fail to explain a ratio of what elements constitute the distribution area ratio.

For the purpose of examination, the examiner interpreted the distribution area ratio to mean the ratio between the number of sub-pixels driven by a set of gamma characteristics and the total number of sub-pixels.

5. Furthermore, in **claims 15, 17 and 20**, the limitation where "the first distribution area ratio and the second area ratio are equal to the distribution area ratio" is unclear as to what is being equated, thus the examiner interpreted the limitation to read "*the sum* of the first distribution area ratio and the second distribution area ratio, *equals the total* distribution area ratio", and following the interpretation above, the total distribution area ratio would amount to one when there is one pixel per block (as in claims 15 and 17), and would amount to two when there are two pixels per block (as in claim 20).

The dependent claims inherent the issues of the parent claims.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 14-16, and 23-26** are rejected under 35 U.S.C. 102(b) as being anticipated by Sawabe in US 2003/0146893.

8. Regarding **claims 14 and 25**, Sawabe teaches a matrix-type display apparatus (Fig. 1, element 1) which drives a liquid crystal display panel (Fig. 1, LCD panel 7) including a plurality of pixels disposed in matrix form (as shown in Fig. 2) and displays an image (para. 1), characterized by including:

a converting portion (Fig. 1, drive signal generation section) for gamma converting an input video signal (para. 98 referring to wide viewing angle and para. 122 regarding gamma characteristics), using n pairs of gamma characteristics (Fig. 19 and para. 248, 254, multiple look-up tables LUT0-4) which are made up of first and second gamma characteristics different from each other (Table 1 shows values for a LUT; A(D) is the first gamma characteristic and B(D) is the second gamma characteristic and shown they are different, e.g. A(192)=25 while B(192)=255); and

a selecting portion (Fig. 19, switch 58) for selecting one pair of gamma characteristics from among the n pairs of gamma characteristics (para. 249) according to a transmittance to be used for display (para. 251 where the LUTs are selected based

on the viewing angle, para. 253-254 where contrast can be changed, and para. 268 where contrast is dependent on transmittance; thus teaching selecting the LUTs based on transmittance), and selecting an output supplied to the display panel from among the 2n outputs which are gamma corrected by the converting portion (para. 251 where one of the LUTs is selected, and para. 117 where one pixel receives six kinds of data; thus teaching selecting an output supplied to the divisional pixel A or B from the selected LUT, selected pixel value), so that a first distribution area ratio of pixels (Fig. 33, where the first distribution area is the 2 bright pixels and 1 dark pixel belonging to divisional pixel A of the pixel formed at the 1st row and 1st column) driven by the video signal gamma corrected by use of the first gamma characteristic (Table 1, divisional pixel A) of the selected pairs of gamma characteristics (Fig. 19, LUTs 0-4) and a second distribution area ratio of pixels (Fig. 33, where the second distribution area is the 2 dark pixels and 1 bright pixel belonging to divisional pixel B of the pixel formed at the 1st row and 1st column) driven by the video signal gamma corrected by use of the second gamma characteristic (Table 1, divisional pixel B) of the selected pairs of gamma characteristics (Fig. 19, LUTs 0-4) are equal to a distribution area ratio specified in advance for the selected pairs of gamma characteristics (para. 317, where brightness and darkness are allocated based on luminance).

9. Regarding **claim 15**, Sawabe teaches the selecting portion (Fig. 19, switch 58) selects an output supplied to the display panel (as shown in Fig. 19) from among the 2n outputs which are gamma corrected by the converting portion (LUTS 0-4), so that the

first distribution area ratio (Fig. 33, first distribution area ratio is the 3/6 from three subpixels in divisional pixel A over six total subpixels in a pixel) and the second distribution area ratio (Fig. 33, second distribution area ratio is the 3/6 from three subpixels in divisional pixel B over six total subpixels in a pixel) are equal to one (six subpixels or 3/6+3/6) in a block unit of (n+1) pixels (six pixels, 5 LUTs, thus 5+1=6) per block.

10. Regarding **claim 16**, Sawabe teaches the first distribution area ratio and the second distribution area ratio for each pair of gamma characteristics are selected out of k/(n+1) and (1-k)/(n+1), if k is an integer of one to n (Fig. 33, k=3, n=6, thus, first distribution area ratio and second distribution area ratio are selected to be 3/6).

11. Regarding **claims 23 and 24**, Sawabe teaches the selecting portion selects an output supplied to the display panel from among the 2n outputs which are gamma corrected by the converting portion, in a unit of one pixel made up of an R-pixel, a G-pixel and a B-pixel which are each set as one pixel (as shown in Fig. 3 each pixel RGB is a pixel as part of a divisional pixel).

12. Regarding **claim 26**, Sawabe teaches a driving method for a matrix-type display apparatus (Fig. 1, element 1) which drives a display panel (Fig. 1, LCD panel 7) including a plurality of pixels disposed in matrix form (as shown in Fig. 2) and displays an image (para. 1), characterized by including:

a converting step (Fig. 1, element 2, drive signal generation) for gamma converting an input video signal (para. 98 referring to wide viewing angle and para. 122 regarding gamma characteristics), using n pairs of gamma characteristics (Fig. 19 and para. 248, 254, multiple look-up tables LUT0-4) which are made up of first and second gamma characteristics different from each other (Table 1 shows values for a LUT; A(D) is the first gamma characteristic and B(D) is the second gamma characteristic and shown they are different, e.g. A(192)=25 while B(192)=255); and

a selecting portion (Fig. 19, switch 58) for selecting one pair of gamma characteristics from among the n pairs of gamma characteristics (para. 249) according to a transmittance to be used for display (para. 251 where the LUTs are selected based on the viewing angle, para. 253-254 where contrast can be changed, and para. 268 where contrast is dependent on transmittance; thus teaching selecting the LUTs based on transmittance), and selecting an output supplied to the display panel from among the 2n outputs which are gamma corrected by the converting portion (para. 251 where one of the LUTs is selected, and para. 117 where one pixel receives six kinds of data; thus teaching selecting an output supplied to the divisional pixel A or B from the selected LUT, selected pixel value), so that a first distribution area ratio of pixels (Fig. 33, where the first distribution area is the 2 bright pixels and 1 dark pixel belonging to divisional pixel A of the pixel formed at the 1^{st} row and 1^{st} column) driven by the video signal gamma corrected by use of the first gamma characteristic (Table 1, divisional pixel A) of the selected pairs of gamma characteristics (Fig. 19, LUTs 0-4) and a second distribution area ratio of pixels (Fig. 33, where the second distribution area is the 2 dark

pixels and 1 bright pixel belonging to divisional pixel B of the pixel formed at the 1st row and 1st column) driven by the video signal gamma corrected by use of the second gamma characteristic (Table 1, divisional pixel B) of the selected pairs of gamma characteristics (Fig. 19, LUTs 0-4) are equal to a distribution area ratio specified in advance for the selected pairs of gamma characteristics (para. 317, where brightness and darkness are allocated based on luminance).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. **Claims 17 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawabe in US 2003/0146893.

15. Regarding **claim 17**, Sawabe's fifth embodiment (applied to claim 14) does not teach two different pixel areas Sa and Sb, where Sb's area is equal to m times Sa. However, Sawabe teaches in his second embodiment:

each pixel of the display panel is made up of, as one pixel, a first sub-pixel which has a first pixel area Sa (Fig. 12, pixel W) and a second sub-pixel which has a second pixel area Sb (Fig. 12, pixels R, G and B as a whole, which as shown in Fig. 13 have a greater combined area than W), and

the selecting portion selects an output supplied to the display panel which are gamma corrected by the converting portion (Table 2 shows the gamma corrected vectors), so that the first distribution area ratio (W) and the second distribution area ratio (RGB) are equal to the distribution area equal to 1 (where RGB occupies an area an W occupies the remaining area).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use two sub-pixel areas (as taught by Sawabe's second embodiment) in Sawabe's fifth embodiment, in order to obtain the added benefit of easy adjustment in the gradation on the display screen and easy improvement in the display performance (para. 185).

16. Regarding **claim 20**, Sawabe teaches in his second embodiment:

17. Sawabe's fifth embodiment (applied to claim 14) does not teach two different pixel areas Sa and Sb, where Sb's area is equal to m times Sa. However, Sawabe teaches in his second embodiment:

each pixel of the display panel is made up of, as one pixel, a first sub-pixel which has a first pixel area Sa (Fig. 12, pixel W) and a second sub-pixel which has a second pixel area Sb (Fig. 12, pixels R, G and B as a whole, which as shown in Fig. 13 have a greater combined area than W), and

the selecting portion selects an output supplied to the display panel which are gamma corrected by the converting portion (Table 2 shows the gamma corrected vectors), so that the *sum of the* first distribution area ratio (RGB) and the second

distribution area ratio (W) is equal to two when there are two pixels per block (where RGB occupies an area an W occupies the remaining area, when there are two pixels, the two RGB areas and the two W areas occupy two pixels).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention, to use two sub-pixel areas (as taught by Sawabe's second embodiment) in Sawabe's fifth embodiment, in order to obtain the added benefit of easy adjustment in the gradation on the display screen and easy improvement in the display performance (para. 185).

18. **Claims 18, 19, 21 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawabe in US 2003/0146893 in view of Lee in US 2004/0046725.

19. Regarding **claim 18**, Sawabe does not teach the area ratios for the two area pixels (RGB and W). However, Lee teaches a LCD four sub-pixel configuration where all pixels have the same area (Lee, Fig. 3A and para. 60).

Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use the same pixel size for the RGBW subpixels of Sawabe's second embodiment, because it is one of the available pixel configurations that would not require different pixel manufacturing.

By using the same pixel size in the RGBW subpixel of Sawabe's second embodiment, the first distribution area (W) would be 1/4 of the total area, and the

second distribution area (RGB) would be 3/4 of the total area. Thus, if m=3, m+1=4 and the distribution area ratios meet the criteria of either 1/(m+1) or m/(m+1).

20. Regarding **claim 19**, Sawabe in view of Lee teach the second pixel area Sb (RGB) satisfies the relation Sb=3Sa (given that all pixels have the same area and Sb is the total size of RGB, and Sa is the area of W).

21. Regarding **claim 21**, Sawabe does not teach the area ratios for the two area pixels (RGB and W). However, Lee teaches a LCD four sub-pixel configuration where all pixels have the same area (Lee, Fig. 3A and para. 60).

Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use the same pixel size for the RGBW subpixels of Sawabe's second embodiment, because it is one of the available pixel configurations that would not require different pixel manufacturing.

By using the same pixel size in the RGBW subpixel of Sawabe's second embodiment, the first distribution area (W) would be 1/4 of the total area of one pixel, or two white subpixel areas would occupy 2/8 of the total area of two pixels, and the second distribution area (RGB) would be 3/4 of the total area of one pixel, or two RGB subpixel areas would occupy 6/8 of the total area of two pixels. Thus, for two pixels, if m=3, then 2m=6, 2+2m=8, and the distribution area ratios meet the criteria of either 2/(2+2m) or 2m/(2+2m).

22. Regarding **claim 22**, Sawabe in view of Lee teach the second pixel area Sb (two times the area of RGB) to satisfy Sb = 3Sa (Sb is 6/8 and Sa is 2/8 from claim 21), but fail to teach Sb satisfying the relation $1.2Sa \leq Sb \leq 2Sa$. However, Lee teaches in other embodiments (Lee, Figs. 3C and 3B) that the white pixel can have a smaller or bigger area. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use a smaller white subpixel, and thus satisfy the relationship $1.2Sa \leq Sb \leq 2Sa$, given that it would have been obvious to one of ordinary skill in the art at the time of the invention to have expected the close ranges (2Sa and 3Sa) to have the same properties. (See MPEP 2144.05)

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Son et al. in US 2005/0128413 teach different size pixels.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LILIANA CERULLO whose telephone number is (571)270-5882. The examiner can normally be reached on Monday to Thursday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LC

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629